AIR CONTENT
OF FRESHLY MIXED CONCRETE
BY THE
PRESSURE METHOD (TYPE B)
AASHTO T 152

APPARATUS

[ ] Air Meter, Type B, calibrated in accordance with AASHTO T 152
- [ ] Basic function check of air meter by IAT
- [ ] Air chamber can be pressurized to stabilized maximum IPL mark
- [ ] Pressure loss no more than 1/2 IPL mark in 90 seconds

[ ] Balance
- [ ] Class G 20, in accordance with AASHTO M 231
- [ ] Range extends from mass of measure empty to mass of measure plus contents at 160 lb/ft^3

[ ] Tamping Rod
- [ ] Round straight steel rod 5/8 $\pm$ 1/16 inch diameter
- [ ] At least 4 inches longer than the measure used
- [ ] Maximum length of 24 inches
- [ ] Tamping end rounded to hemispherical tip with same diameter as the rod

[ ] Internal Vibrator
- [ ] Rigid or flexible shaft powered by electric motor
- [ ] Minimum frequency of vibration of 7000 vibrations per minute
- [ ] Outside diameter or side dimension at least 3/4 in. and not greater than 1 1/2 in.
- [ ] Combined length of shaft and vibrating element exceeds maximum depth of bowl by at least 3 in.

[ ] Mallet
- [ ] Rubber or rawhide head
- [ ] Weight of 1.25 ± 0.50 lb for use with bowls 0.5 ft^3 or smaller
- [ ] Weight of 2.25 ± 0.50 lb for use with measure larger than 0.5 ft^3

[ ] Strike-Off Bar
- [ ] Flat straight bar of steel or other suitable metal
- [ ] At least 1/8 in. thick by 3/4 in. wide by 12 in. long

[ ] Strike-Off Plate
- [ ] Flat rectangular metal plate at least 1/4 in. thick or a glass or acrylic plate at least 1/2 in. thick
- [ ] Length and width at least 2 in. greater than diameter of measure
- [ ] Edges straight and smooth within a tolerance of 1/16 in.

[ ] Calibration Vessel
- [ ] Vessel marked with serial number that matches air meter apparatus
- [ ] Vessel marked with representative percent air content for air meter apparatus

[ ] Tubes, one short straight piece and one J-shaped piece, each threaded at one end

[ ] Scoop, a size large enough that the amount of concrete obtained from the sampling receptacle is representative and a size small enough that the concrete is not spilled during placement into the measuring bowl

PROCEDURE -- AGGREGATE CORRECTION FACTOR

[ ] Aggregates are relatively dense. Procedure not applicable to light-weight aggregate, air-cooled blast furnace slag or aggregates of high porosity. In such cases, AASHTO T 196 shall be used.

[ ] Weight of fine and coarse aggregate determined as follows:

$$F_s = \frac{S}{B} \text{ x } F_b$$

$$C_s = \frac{S}{B} \text{ x } C_b$$

where:

F_s = weight of fine aggregate in concrete sample under test, lb.
S = volume of measuring bowl, ft^3
B = volume of concrete produced per batch, ft^3
F_b = total weight of fine aggregate in the moisture condition used in batch, lb
C_s = weight of coarse aggregate in concrete sample under test, lb
C_b = total weight of coarse aggregate in the moisture condition used in batch, lb

[ ] Aggregates in same moisture condition as aggregates used in the concrete
[ ] Representative samples of fine and coarse aggregate are mixed together
[ ] Measuring bowl filled one-third full with water
[ ] Mixed aggregates placed in small amounts into the measuring bowl in manner that would entrap as little air as possible, and accumulated foam removed immediately, if present
[ ] After each addition of aggregate, sample stirred, the upper 1 in. of aggregate lightly rodded 8-12 times, and sides of bowl tapped
[ ] Aggregate in bowl covered with water at all times
[ ] Cover assembly placed on bowl
[ ] Air valve between air chamber and measuring bowl closed, and both petcocks opened
[ ] Water injected through one petcock until water emerges from opposite petcock
[ ] All entrapped air has been removed
[ ] Air pumped into air chamber to a stabilized initial pressure line which is correct for meter
[ ] Both petcocks closed and pressurized air released into bowl containing sample
[ ] Water removed from meter into the calibration vessel which represents % air
[ ] Aggregate correction factor determined as follows:

Aggregate correction factor = reading on gage - % of air removed

PROCEDURE -- AIR CONTENT

[ ] Compaction method of concrete is according to following table (for PCCP, the compaction method for beams shall be by vibration)

Slump	Method
> 3 in.	Rodding
1 to 3 in.	Rodding or Vibration (Note 1)
< 1 in.	Vibration

Note 1 -- Overvibration may cause segregation and loss of intentionally entrained air. Usually, sufficient vibration has been applied as soon as the surface of the concrete becomes relatively smooth and has a glazed appearance.

Placement and Consolidation -- Rodding Method

[ ] Interior of measuring bowl dampened, and bowl placed on a flat, level surface
[ ] Bowl filled in three layers of approximately equal volume using the scoop
[ ] Each layer rodded 25 strokes with tamping rod, evenly distributed over cross section
[ ] Bottom layer rodded throughout its depth without rod forcibly striking the bottom of the bowl
[ ] Second and top layer rodded throughout its depth so that the strokes penetrate about 1in. into the underlying layer
[ ] Bowl tapped smartly 10 to 15 times with mallet after each layer is rodded
[ ] An excess of concrete is protruding approximately 1/8 in. above the top of the bowl after rodding and tapping (Note 2)
[ ] Top surface struck off with bar and finished smooth
[ ] Top surface struck off with plate and finished smooth
    [ ] Plate pressed on top surface of measure covering two-thirds of surface and plate withdrawn with sawing motion
    [ ] Plate again placed over original two-thirds of surface and advanced with vertical pressure and sawing motion
    [ ] Several final strokes are made with the inclined edge of the plate to produce smooth finished surface

Note 2 -- A small quantity of representative concrete may be added to correct a deficiency. If the measure contains great excess, remove a representative portion of the concrete with a trowel or scoop before the measure is struck off.

Placement and Consideration -- Vibration Method

[ ] Interior of measuring bowl dampened, and bowl placed on a flat, level surface
[ ] Bowl filled in two layers of approximately equal volume
[ ] All of concrete for each layer placed in measure before starting vibration
[ ] Vibrator inserted at three different points of each layer
[ ] Vibrator not resting on or touching the bottom or sides of bowl when compacting bottom layer
[ ] Vibrator withdrawn in such a manner that no air pockets are left in the concrete
[ ] Duration of vibration is such that the surface of the concrete is relatively smooth and proper consolidation is achieved (overvibration may cause segregation and loss of intentionally entrained air).
[ ] An excess of concrete is protruding approximately 1/8 in. above the top of the bowl after vibration
[ ] Top surface struck off with bar and finished smooth
[ ] Top surface struck off with plate and finished smooth
    [ ] Plate pressed on top surface of measure covering two-thirds of surface and plate withdrawn with sawing motion
    [ ] Plate again placed over original two-thirds of surface and advanced with vertical pressure and sawing motion
    [ ] Several final strokes are made with the inclined edge of the plate to produce smooth finished surface

Air Content Method

[ ] Flanges of bowl and cover assembly thoroughly cleaned, and air meter assembled to obtain a pressure tight seal
[ ] Air valve between air chamber and bowl closed, and both petcocks opened
[ ] Using a rubber syringe, water injected through one petcock until water emerges from opposite petcock
[ ] Meter jarred gently until all air is expelled from this same petcock
[ ] Air bleeder valve on air chamber closed and air pumped into air chamber until gage hand is on the initial pressure line
[ ] A few seconds allowed for compressed air to cool
[ ] Gage hand at the initial pressure line stabilized by pumping or bleeding-off air as necessary while tapping gage lightly
[ ] Both petcocks closed
[ ] Air valve between air chamber and measuring bowl opened
[ ] Sides of measuring bowl tapped smartly with mallet to relieve local restraints
[ ] Pressure gage tapped lightly with hand to stabilize reading while air valve is open and percentage of air on the dial of pressure gage read

[ ] Air content of sample calculated as follows:

$A_S = A_1 - G$

where:

A_S = air content of sample tested, percent
A_1 = apparent air content of the sample tested, percent
G = aggregate correction factor, percent

If comparison readings are not within the required agreement tolerance and the calibration of the air meter is suspect, a check on the air meter in the field according to the calibration procedure will be conducted.

NA - Not Applicable
X - Requires Corrective Action
√ - Satisfactory

_____
Acceptance Technician

_____ _____
INDOT Date

Comments: _____

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